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Indian Standard
SPECIFICATION FOR RUBBER HOT WATER BOTTLES
(*First Revision*)

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Indian Standard

SPECIFICATION FOR RUBBER HOT WATER BOTTLES

(First Revision)

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Indian Standard

SPECIFICATION FOR RUBBER HOT WATER BOTTLES

(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 30 April 1975, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Chemical Division Council.

0.2 In this revision requirements for plastics stopper, water immersion test and the sampling procedure have been modified. Requirements for rubber washer have also been included in this revision.

0.3 Articles made from rubber deteriorate in use and in storage. To reduce this natural deterioration recommendations for proper use and storage of rubber hot water bottles have also been given in Appendix A.

0.4 This standard contains clauses **3.1.2** and **3.1.3** which call for agreement between the purchaser and the supplier.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for rubber hot water bottles without fabric insertion.

2. SIZE AND CAPACITY

2.1 Size — The rubber hot water bottles shall be of the following nominal sizes, with tolerance of ± 10 mm :

a) Height 250 mm × width 190 mm, and

b) Height 300 mm × width 200 mm.

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*Rules for rounding off numerical values (*revised*).

2.2 Capacity — When determined according to the method prescribed in Appendix B, the capacity of rubber hot water bottles shall be not less than 1·5 litres in case of size 250 × 190 mm and 2 litres in case of size 300 × 200 mm.

3. REQUIREMENTS

3.1 Raw Material, Construction and Workmanship

3.1.1 The raw materials and the construction shall be such as to ensure satisfactory performance of the rubber hot water bottles under normal conditions of use. The workmanship shall be good throughout and the rubber hot water bottles shall be free from porosity and from flaws causing local reductions in the thickness or strength of the vulcanized rubber below that specified in this standard.

3.1.2 The rubber hot water bottles shall have a smooth or patterned surface as specified by the purchaser. Every bottle shall be accompanied with a spare rubber washer. The rubber washer shall be of good quality and have hardness between 55 and 70 IRHD. It shall not show change in hardness of more than 5 IRHD nor any other apparent deterioration on ageing at 100 ± 1°C for 72 hours in air oven in accordance with IS : 3400 (Part IV)-1965*.

3.1.3 The stopper shall provide a water-tight seal, and metal parts, if any, shall be made from a corrosion resisting material or have a corrosion resisting finish. If plastics stopper is used the type of plastics shall be as approved by the purchaser. The stopper shall also withstand the test stipulated in Appendix C.

3.2 Thickness -- The rubber hot water bottle shall at no point have a wall thickness of less than 1·5 mm, when measured by standard thickness gauge.

3.2.1 The edges and neck shall be strengthened by increasing the thickness of rubber.

3.3 Test for Leakproofness

3.3.1 The rubber hot water bottle shall not show any leakage when tested according to the method prescribed in Appendix D.

3.3.2 The rubber hot water bottle, when inflated with air to a pressure of 10 kN/m^2 (approx 0·1 kgf/cm^2) and immersed in water, shall show no sign of leakage.

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*Methods of test for vulcanized rubber, Part IV Accelerated ageing.

3.4 Tensile Strength and Elongation at Break

3.4.1 *Before Ageing* — When tested according to the method prescribed in IS : 3400 (Part I)-1965*, the vulcanized rubber shall have a tensile strength of not less than 14 MN/m² (approx 140 kgf/cm²) and elongation at break of not less than 500 percent.

3.4.2 *After Ageing* — The rubber component of the hot water bottle, when aged in an air oven at a temperature of 100 ± 1°C for 72 hours, in accordance with the method prescribed in IS : 3400 (Part IV)-1965†, shall not become tacky or show any cracks on the surface, and the tensile strength and elongation at break of aged test pieces of rubber shall not vary by more than ± 30 percent and $^{+10}_{-35}$ percent respectively of the corresponding values of the unaged test pieces when tested according to the method prescribed in IS : 3400 (Part I) 1965*.

3.4.3 *After Immersion* — After continuous immersion of the test pieces in water at a temperature of 90 ± 1°C for 72 hours the tensile strength and elongation at break shall not be less than 75 and 20 percent respectively of the original value.

3.4.3.1 The dimensions of the test pieces shall be taken before immersion in water. After termination of the immersion period, the test pieces shall be stored in water at room temperature for a period of 16 to 24 hours before testing. All free surface moisture shall be removed by a suitable absorbent from the test pieces before testing.

3.5 Tension Set — The tension set of the vulcanized rubber, when determined by the method prescribed in IS : 3400 (Part XIII)-1972‡, shall not exceed 15 percent. The test piece shall be stretched to 100 percent elongation at room temperature.

4. MARKING

4.1 Each rubber hot water bottle shall be permanently marked with the size and the identification of the manufacturer or supplier and the year of manufacture.

4.1.1 Each rubber hot water bottle may also be permanently and visibly marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which

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*Methods of test for vulcanized rubber, Part I Tensile stress-strain properties.
†Methods of test for vulcanized rubber, Part IV Accelerated ageing.
‡Methods of test for vulcanized rubber, Part XIII Tension set.

is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

5. SAMPLING

5.1 Representative samples shall be drawn as prescribed in Appendix E.

APPENDIX A

(*Clause* 0.3)

RECOMMENDATIONS FOR STORAGE AND USE OF RUBBER HOT WATER BOTTLES

A-1. STORAGE

A-1.1 The bottles should be stored in a dry and cool place, packed loosely in boxes or containers to protect them from the action of light and from being crushed away, from hot pipes, radiators, electrical equipment liable to spark, ultra-violet light, oil and grease. Establish withdrawal from old stock first.

A-2. USE

A-2.1 To put into use, fill the bottle with hot, but not boiling water to not more than two-thirds of its capacity by holding it by the neck — which should be kept upright — and lowering it on to a flat surface until water appears at the opening. Screw the stopper tightly. Do not allow the bottle to come into contact with any hot surfaces, oil or grease.

A-2.2 When not in use, drain completely and store as recommended. When cleaning the surface of the bottle, use soap and water; if synthetic detergents are used, care shall be taken in their selection as some are harmful to rubber.

APPENDIX B

(*Clause* 2.2)

DETERMINATION OF CAPACITY

B-1. PROCEDURE

B-1.1 Fill the rubber hot water bottle with water at room temperature up to the top of the closure or neck plug, and keep it suspended in a vertical position. At the end of the five minutes make up the water, if necessary, and then measure the total volume of water as the capacity of the bottle.

APPENDIX C

(*Clause* 3.1.3)

TEST FOR STOPPER

C-1. PROCEDURE

C-1.1 Keep the plastics stopper immersed in boiling water for 2 hours using sinker, if necessary. Remove the stopper from water and allow it to cool in air at room temperature. The stopper shall not show any signs of deterioration, distortion or other defects when examined after the above treatment. It shall also give satisfactory leak-proof closure when tested as given in Appendix D.

APPENDIX D

(*Clause* 3.3.1)

TEST FOR LEAKPROOFNESS

D-1. PROCEDURE

D-1.1 Fill the rubber hot water bottle completely with hot water having temperature of 80° to 90°C and screw the stopper in position. Suspend the bottle by means of the eyelet at the bottom and allow it to remain in that position for one hour.

D-1.1.1 There shall be no leakage from any part of the bottle.

D-1.2 Fill the rubber hot water bottle completely with water maintaind at 80° to 90°C and screw the stopper in position. Allow the bottle to lie horizontally on a flat surface and subject it to a load of 20 kg evenly distributed over the surface of the bottle for half an hour.

D-1.2.1 There shall be no sign of leakage or other damage.

APPENDIX E

(*Clause* 5.1)

SAMPLING PROCEDURE FOR RUBBER HOT WATER BOTTLES

E-1. LOT

E-1.1 All rubber hot water bottles of the same size and capacity and produced under similar conditions of manufacture shall be grouped together to constitute a lot.

E-1.2 Tests for the determination of the conformity of a lot to the requirements of this specification shall be carried out for each lot separately. For this purpose a number of hot water bottles shall be selected from the lot. This number depends on the size of the lot and shall be as given in Table 1.

TABLE 1 SCALE OF SAMPLING

No. of Hot Water Bottles in the Lot (*N*)	No. of Bottles to be Selected (*n*)	Permissible No. of Defectives in Respect of Each of **2.1**, **2.2**, and **3.1**	No. of Bottles to be Tested for **3.3**	Permissible No. of Defectives with Respect to **3.3**	No. of Bottles to be Tested for **3.2**, **3.4**, and **3.5**
(1)	(2)	(3)	(4)	(5)	(6)
Up to 5	all	0	2	0	1
6 ,, 15	5	0	3	0	1
16 ,, 25	8	0	5	0	1
26 ,, 50	13	0	8	0	2
51 ,, 100	20	1	13	0	2
101 ,, 300	32	2	20	0	2
301 ,, 1 000	50	3	32	0	3
1 001 ,, 5 000	80	5	50	1	5
5 001 ,, 10 000	125	7	80	2	8
10 001 and above	200	10	80	2	8

E-1.3 The water bottles shall be selected at random in accordance with col 1 and 2 of Table 1. In order to ensure the randomness of selection, random sampling procedure given in IS : 4905-1968* may be followed.

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*Methods for random sampling.

E-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

E-2.1 All the hot water bottles selected in accordance with **E-1.2** and **E-1.3** shall be examined for workmanship and construction first and then for size and capacity. The number of defective bottles in respect of each of the requirement of clauses **2.1, 2.2** and **3.1** shall not exceed the permissible number specified in col 3 of Table 1.

E-2.2 If the lot is found acceptable under **E-2.1** it shall be examined for leakproofness of bottles. For this, the sample size and the permissible number of defectives shall be as given in col 4 and 5 of Table 1.

E-2.3 The lot, if found satisfactory under **E-2.2** shall be subjected to test for determination of tensile strength and elongation at break. The number of bottles to be tested is given in col 6 of Table 1. There shall be no failures for the lot to be declared satisfactory under this clause. For tension set and thickness, the number of tests and criterion for conformity shall be the same as for tensile strength.

E-2.4 The lot shall be deemed as conforming to the requirements of this specification if **E-2.1, E-2.2** and **E-2.3** are satisfied.

INDIAN STANDARDS ON MEDICAL RUBBER PRODUCTS

IS :	
1867-1975	Rubber hot water bottles (*first revision*)
3565-1966	Rubber tests for feeding bottles
3692-1965	Rubber closures (pharmaceutical)
3701-1966	Rubber protective sheaths (condoms)
3867-1966	Rubber ice bags
4135-1974	Hospital rubber sheetings (*first revision*)
4148-1967	Surgical rubber gloves
4149-1967	Pust-mortem rubber gloves
5680-1969	Rubber tubing for medical use
5783-1970	Rubber ward-dressing and porter's gloves
6058-1970	Rubber components for transfusion fluid bottles
6407-1971	Rubber aprons for hospital use
7352-1974	X-ray lead-rubber protective aprons
7523-1974	Rubber catheter (urinary)

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AMENDMENT NO. 1 MAY 1976

TO

IS:1867-1975 SPECIFICATION FOR RUBBER HOT WATER BOTTLES

(First Revision)

Alteration

(Page 5, clause 3.4.3, line 3) - Substitute '80 percent' *for* '20 percent'.

(CDC 6)

Reprography Unit, ISI, New Delhi

AMENDMENT NO. 2 JANUARY 1983
TO
IS : 1867-1975 SPECIFICATION FOR RUBBER HOT WATER BOTTLES

(*First Revision*)

Alterations

(*Page* 4, *clause* **3.1.2**, *last line*) — Substitute ' 1978 ' *for* ' 1965 '.

(*Page* 4, *clause* **3.2**) — Substitute the following for the existing clause:

'**3.2** The rubber hot water bottle shall at no point have a wall thickness of less than 1·2 mm, when measured by standard thickness gauge. '

(*Page* 4, *foot-note with* ' * ' *mark*) — Substitute the following for the existing foot-note:

'*Methods of test for vulcanized rubber: Part IV Accelerated ageing (*first revision*). '

(*Page* 5, *clause* **3.4.1**, *line* 2) — Substitute ' 1977 ' *for* ' 1965 '.

(*Page* 5, *clause* **3.4.2**) — Substitute the following for the existing clause:

3.4.2 *After Ageing* — The rubber component of the hot water bottle, when aged in an air oven at a temperature of 100 ± 1°C for 72 hours, in accordance with the method prescribed in IS : 3400(Part IV)-1978* shall not become tacky or show any cracks on the surface, and the tensile strength and elongation at break of the aged test pieces of rubber shall not vary by more than $^{+10}_{-30}$ and $^{+10}_{-35}$ percent respectively of the corresponding values of the unaged test pieces when tested according to the method prescribed in IS : 3400(Part I)-1977†. '

(*Page* 5, *foot-notes with* ' * ' *and* ' † ' *marks*) — Substitute the following for the existing foot-notes:

'*Methods of test for vulcanized rubber : Part IV Accelerated ageing (*first revision*).

†Methods of test for vulcanized rubber: Part I Tensile stress-strain properties (*first revision*). '

(*Page* 6, *clause* **5.1**) — Substitute the following for the existing clause:

'**5.1** Representative samples shall be drawn and conformity of the material to the requirements of the specification shall be determined according to the procedure given in Appendix E. '

(*Pages* 8 *and* 9, *Appendix* E) — Substitute the following for the existing appendix:

APPENDIX E

(*Clause* 5.1)

SAMPLING PLAN FOR RUBBER HOT WATER BOTTLES

E-1. LOT

E-1.1 All rubber hot water bottles of the same size and capacity and produced under similar conditions of manufacture shall be grouped together to constitute a lot.

E-1.2 Tests for the determination of the conformity of a lot to the requirements of the specification shall be carried out for each lot separately. For this purpose a number of hot water bottles shall be selected from the lot. This number depends on the size of the lot and shall be as given in Table 1

E-1.3 The hot water bottles shall be selected at random in accordance with col 1 and 2 of Table 1. In order to ensure the randomness of selection, random sampling procedures given in IS : 4905-1968* may be followed.

E-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

E-2.1 All the hot water bottles selected according to **E-1.2** and **E-1.3** shall be examined for raw material, construction and workmanship (**3.1**). A bottle failing in one or more of these requirements shall be considered as defective. The lot shall be considered to have satisfied these requirements if number of defective bottles found in the sample is less than or equal to the corresponding permissible number given in col 3 of Table 1.

E-2.2 The lot having been found satisfactory according to **E-2.1** shall be examined for size (**2.1**) and capacity (**2.2**). For this purpose, the sample size and permissible number of defectives shall be as given in col 4 and 5 of Table 1.

E-2.3 If the lot is found to be satisfactory according to **E-2.2**, it shall be tested for leak-proofness (**3.3**) of bottles. For this purpose, the sample size and permissible number of defectives shall be as given in col 6 and 7 of Table 1.

E-2.4 The lot having been found satisfactory according to **E-2.4** shall be finally tested for thickness (**3.2**), tensile strength and elongation at break (**3.4**) and tension set (**3.5**). The number of bottles to be tested for this purpose is given in col 8 of Table 1. A sample bottle failing in any of these requirements shall be considered as defective. The lot shall be considered to have met these requirements if none of the bottles tested in the sample is found to be defective for each of these requirements. '

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*Methods for random sampling.

TABLE 1 SCALE OF SAMPLING

No. of Hot Water Bottles in the Lot (1)	No. of Bottles to be Selected in Respect of 3.1 (2)	Permissible No. of Defectives in Respect of 3.1 (3)	No. of Bottles to be Selected in Respect of 2.1 and 2.2 (4)	Permissible No. of Defectives in Respect of 2.1 and 2.2 (5)	No. of Bottles to be Tested for 3.3 (6)	Permissible No. of Defectives for 3.3 (7)	No. of Bottles To be Tested for 3.2, 3.4 and 3.5 (8)
Up to 5	All	0	1	0	2	0	1
6 ,, 15	5	0	1	0	3	0	1
16 ,, 25	8	0	2	0	5	0	1
26 ,, 50	13	0	2	0	8	0	2
51 ,, 100	20	1	3	0	13	0	2
101 ,, 300	32	2	5	0	20	0	2
301 ,, 1 000	50	3	8	0	32	0	3
1 001 ,, 5 000	80	5	13	0	50	0	5
5 001 ,, 10 000	125	7	20	1	80	1	8
10 001 and above	200	10	20	1	125	2	8